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***Building statistical neurons in case of regional development projects***

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***Abstract***

**History & Background**

The Authors of this paper have been previously working together on topics such as measuring homogeneity of European Countries based on statistical dataset using AI (cf.: <https://miau.my-x.hu/miau/302/homogeneity_abs.docx>), defining border lines of the Mezőföld region (Hungary) using self designed AI engine models (cf.: <https://miau.my-x.hu/miau/311/mezofold/full_region_team_sustainability_analyses.pdf>). As a consequence, the latest research topic is about measuring and defining the Cultural Homogeneity of Hungary‘s capital: Budapest’s districts. This paper was developed, to showcase an unexpected sub-result of the overall project. The term of statistical neurons as such is a new term, but the workflow behind it is already tested for context free time-series, where the cutting points should be derived in a real-time way: c.f. https://miau.my-x.hu/miau2009/index.php3?x=e0&string=szakaszolas

**Brief methodology & Results:**

Budapest is currently divided into 23 districts. Our raw dataset was downloaded from the website of the National Spatial Development and Planning Information System (cf.: <https://www.oeny.hu/oeny/teir/#/>) consisting of 83 attributes in case of each district and between 2011 and 2023. After carrying out necessary steps to clean the raw dataset (cf.: relativizing absolute numbers, cleaning up attributes with missing values etc.) we began with our first experiment to define which district has the most impact on the overall standard deviation, if one of the district’s data-points at a time were deleting from the dataset. To do this, we constructed an OAM (Object-Attribute-Matrix) where the objects are the official statistical indicators for Budapest always deleted a particular district (they are the same in case of all 23 districts) and the attributes are the years (2011-2023). Of course, it is necessary to have a benchmark object, where each district is given. Based on this, a second table was made showing the impacts on standard deviation (concerning parallel each attribute – c.f. impulses for a statistical neuron) in case of the single deleted district for each year. After unifying (replacing the unit of measure of numbers with rankings) the results of this table the output is a barcode-like creation. This result questions the need of optimisation using complicated neural networks in case of such experiments which are based on GEO Statistical datasets. This also means, processing times could be massively reduced – it means the real-time analysis is therefore given. Parallel: the pure statistical analysis delivered high correlation (0.96?) to the complex (optimized) anti-discriminative similarity analysis having the same OAM as input – exactly as before in case of the cutting robots for context-free time-series.